How Important Is Moral Hazard For Distressed Banks?

September 2020

Itzhak Ben-David, *The Ohio State University and NBER*

Ajay A. Palvia, *Federal Deposit Insurance Corporation*

René M. Stulz, *The Ohio State University and NBER*

Disclaimer: Views expressed are those of the authors and not those of the Federal Deposit Insurance Corporation or the U.S. Government.
Introduction

• Moral hazard refers to situations in which one party makes choices about how much risk to take, but does not bear the cost if things go badly.
• The theoretical literature argues government safety nets could create strong moral hazard incentives in distressed banks. These incentives suggest distressed banks will:
  - Not attempt to deleverage.
  - Pursue risky investments.
• The moral hazard driven risk-taking incentives have sometimes been characterized as incentives to gamble. -- This characterization is a commonly held view in the banking literature.
  -- For example, Freixas, Rochet, and Parigi (2004) write that moral hazard and gambling for resurrection are “typical behaviors for banks experiencing financial distress.”
• However, many factors such as regulation, managerial risk aversion, etc., could limit moral hazard incentives
  -- Existing empirical evidence is mixed.
  -- Overall net effect of these factors remains an unsettled question.
What we do and preview of results

- We explore in a systematic fashion whether the behavior of distressed banks is consistent with deleveraging or greater risk-taking.
- We focus on US banks during periods surrounding the S&L and Global-Financial-Crisis. These periods each witnessed substantial bank financial distress.
- We find distressed banks:
  -- Decreased their leverage
  -- Made efforts to shrink their balance sheets (both assets and liabilities)
  -- Did not increase risk-taking
- The results suggest moral hazard incentives do not drive distressed bank behavior for the average bank.
Highly leveraged banks have incentives to not decrease leverage and increase risk because:
-- They don’t bear the full cost of risk-taking due to deposit insurance (Merton, 1977).
-- Because they have little at stake, i.e. low remaining value of equity (Jensen and Meckling, 1976).
-- Have debts so large that any gains go to creditors so even sound investments are avoided (Myers, 1977).

Moral hazard is a common theme among these models – i.e., leverage and or risk-taking choices of distressed firms is at the expense of creditors and potentially beneficial only to shareholders.
-- Other more recent theoretical models similarly suggest distressed firms resist deleveraging or take on more risk.

While many of theoretical studies are not focused on banks– the arguments readily apply to banks.
-- Admati (2014) notes that banks have especially high leverage and avoid deleveraging as it benefits only creditors and hurts shareholders.

Moral Hazard Incentives
Moral Hazard – Limiting Factors

- Banks may find it sub-optimal to engage in moral hazard behaviors for various reasons including:
  -- Preserving managerial reputation (Hirschleifer, 1993)
  -- Managerial risk-aversion (e.g., Kim and Santomero, 1988)
  -- Threat of runs (e.g. Cooper and Ross, 1998)
  -- Bond covenants (e.g. Ashcraft, 2008)
  -- Preservation of franchise value (e.g., Demsetz, Saidenberg, and Strahan, 1996)

- Further, regulation may limit risk taking incentives in several ways:
  -- Capital requirements limit moral hazard incentives (Rochet (1992); Hellmann, Murdock, and Stiglitz (2000); Admati (2014))
  -- Regulators could directly prevent “gambling for resurrection” (Dewatripont and Tirole (2012))
  -- Banks may want to avoiding regulatory interventions (e.g., Kandrak, J. and B. Schlusche, 2018)

- In summary, regulation in addition to numerous other forces likely incentivize distressed banks to deleverage and de-risk rather than gamble.
Evidence

- Evidence based on S&L crisis period suggests:
  -- Increased competition and reduced bank charter values gave banks incentives to gamble (e.g., Shoven et al (1992), Benston and Kaufman (1997), Field (2017)).
  -- Fixed premium deposit insurance incentivized depositors to fund gambling banks regardless of risk.
- A related literature suggested there were limiting forces, i.e. “market discipline” in that uninsured depositors were likely to flee distressed banks especially if not compensated for the higher risk.
- Mixed recent evidence:
  -- Baldursson and Portes (2013) find support for gambling behavior for banks in Iceland.
  -- Laeven and Levine (2009) find cross-country evidence that regulation can limit risk-taking incentives.
  -- Bonaccorsi di Patti and Kashyap (2017) find some troubled Italian banks gamble but others do not.
Data

• Data: Primarily rely on mandatory financial reports (call reports) reported by all banks
  -- First period has about 16k banks and 480k bank-quarters
  -- Second period has about 8k banks and 260k bank-quarters
  -- Each period includes a crisis; first period (S&L) and second period (GFC)
• Use large set of financial and non-financial controls including:
  -- Financial: Log assets, Assets > $50bn, MBHC member, Deposits/liabilities, Loans/assets, Core deposit ratio
  -- Non-Financial: Metro location, De novo bank, TARP, Change in log state per-capita income, Change in state unemployment rate
• Distress indicators: Low Z-score and Equity-Capital
  -- Main Distress measure: Low Z-score AND Low Equity-Capital
Main Tests - Deleveraging

- Two Key Questions: (i) Do distressed banks deleverage and if so, (ii) how do they deleverage?
  -- Estimate following models:
  \[
  \Delta \text{Equity Capital Ratio (q, q+4)} = f_2(D, D*Crisis, X2, Quarter FE, State FE)
  \]
  \[
  \Delta \text{Balance Sheet Item (q, q+4)} = f_3(D, D*Crisis, X3, Quarter FE, State FE)
  \]

- Asset side Measures: Assets, Loans, Fixed Assets, # Branches, and Employees
  Liability side: Liabilities, Deposits, Deposit Rate, Non-Deposit Liabilities
  Equity: Common Stock, Preferred Stock, Dividends

- We use 4-quarter change because it is potentially less noisy relative to 1-qtr
  -- Driscoll-Kray standard errors to address biases from overlapping data (Fahlenbrach et al. (2017).
  -- Lagged dependent variables in certain specifications to mitigate regression to the mean bias.
## Deleveraging – Equity Capital Ratio

<table>
<thead>
<tr>
<th>Dependent variable:</th>
<th>Change in equity capital (q, q+4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample period:</td>
<td>1985-1994</td>
</tr>
<tr>
<td></td>
<td>2005-2014</td>
</tr>
<tr>
<td></td>
<td>2005-2014</td>
</tr>
<tr>
<td>Financial distress (q-1)</td>
<td>0.818*** 0.870*** 0.798*** 0.819*** 0.798*** 0.819***</td>
</tr>
<tr>
<td>× Crisis (q-1)</td>
<td>-0.185 -0.190 -0.507*** -0.494*** -0.525*** -0.512***</td>
</tr>
<tr>
<td>(-1.16) (-1.23) (-4.47) (-4.15) (-4.74) (-4.45)</td>
<td></td>
</tr>
<tr>
<td>× TARP (q-1)</td>
<td>0.518*** 0.546***</td>
</tr>
<tr>
<td></td>
<td>(3.87) (3.97)</td>
</tr>
<tr>
<td>Change in equity capital (q-4, q)</td>
<td>0.046*** 0.026 0.026</td>
</tr>
<tr>
<td></td>
<td>(4.27) (1.51) (1.51)</td>
</tr>
<tr>
<td>Bank-quarter and state-quarter effects</td>
<td>Yes Yes Yes Yes Yes Yes</td>
</tr>
<tr>
<td>Quarter fixed effects</td>
<td>Yes Yes Yes Yes Yes Yes</td>
</tr>
<tr>
<td>State fixed effects</td>
<td>Yes Yes Yes Yes Yes Yes</td>
</tr>
<tr>
<td>N</td>
<td>468728 468395 251668 251275 251668 251275</td>
</tr>
<tr>
<td>R²</td>
<td>0.081 0.083 0.064 0.058 0.064 0.059</td>
</tr>
</tbody>
</table>

### Distressed banks improve their capital ratios by roughly similar amounts each period:
- **1985-1994**: Increase of 0.87 PP (i.e., about 10% and 27% relative to the mean and stdev deviation of capital)
- **2005-2014**: Increase of 0.80 PP (i.e., about 8% and 45% relative to mean and stdev of capital)

--Somewhat less deleveraging during the crisis (about 0.30 PP vs 0.82 PP) but only for non-TARP banks
We re-estimate previous regression but replace crisis dummy with yearly interaction terms.

Main take-away: Yearly interaction coefficients show deleveraging all years of both periods.

Plots also suggests:

- Sustained increasing in deleveraging after FDICIA -- likely driven by more stringent regulation
- No evidence deleveraging greater after GFC.
Deleveraging – Assets and Liabilities

Regression results – we observe distressed banks had:
-- Lower asset growth rates; total assets, loans, and fixed assets declined for both periods.
-- Reduced branch and employee growth for both periods.
-- Decreased total employees salaries over both periods.
-- Reduced liabilities and deposits.
-- Lower deposit rates on average.

Despite substantial differences in the two periods, the response of distressed banks appears to be in similar range in most cases.

Crisis:
-- Deleveraging unchanged during S&L crisis (85-94 period)
-- Sharper reduction various asset/liability indicators during GFC (05-14 period);
-- TARP impact mixed/ambiguous – depends on indicator.

### Change in Assets/Liabilities - Distressed Banks

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Assets</td>
<td>-8.3%</td>
<td>-7.7%</td>
</tr>
<tr>
<td>Loans</td>
<td>-8.9%</td>
<td>-7.9%</td>
</tr>
<tr>
<td>Fixed Assets</td>
<td>-6.7%</td>
<td>-7.5%</td>
</tr>
<tr>
<td>Branches</td>
<td>-3.4%</td>
<td>-5.1%</td>
</tr>
<tr>
<td>Employees</td>
<td>-7.1%</td>
<td>-5.6%</td>
</tr>
<tr>
<td>Salaries</td>
<td>-8.8%</td>
<td>-7.4%</td>
</tr>
<tr>
<td>Sal/Employee</td>
<td>-0.15</td>
<td>-0.265</td>
</tr>
<tr>
<td>Liabilities</td>
<td>-9.5%</td>
<td>-9.6%</td>
</tr>
<tr>
<td>Deposit Rate</td>
<td>-2.6%</td>
<td>-2.8%</td>
</tr>
<tr>
<td>Deposits</td>
<td>9.3%</td>
<td>-9.5%</td>
</tr>
<tr>
<td>Other Liabilities</td>
<td>-18.5%</td>
<td>-20.6%</td>
</tr>
</tbody>
</table>

* Statistically significant results in yellow.
Deleveraging – Equity Components

• Regression Results – we find distressed banks:
  -- Increased level of common stock equity for each period.
  -- Were more likely to increase common equity during both periods.
  -- Increase preferred stock equity in the first period, insignificant result for 2nd period.
  -- Sharply reduced dividends in both periods.

• Crisis impact mixed:
  -- S&L Crisis (85-94): Lower increase in preferred shares but decline in dividends more substantial.
  -- GFC (05-14): Lower increase in common and preferred shares except for banks receiving TARP

Change in Equity/Related Components - Distressed Banks

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Common Stock</td>
<td>1.9%</td>
<td>2.7%</td>
</tr>
<tr>
<td>Preferred Stock</td>
<td>4.5%</td>
<td>-0.1%</td>
</tr>
<tr>
<td>Common Stock (Increase)</td>
<td>8.8%</td>
<td>4.0%</td>
</tr>
<tr>
<td>Preferred Stock (Stock)</td>
<td>3.3%</td>
<td>0.6%</td>
</tr>
<tr>
<td>Common Stock/Equity</td>
<td>0.09</td>
<td>0.05</td>
</tr>
<tr>
<td>Preferred Stock/Equity</td>
<td>0.05</td>
<td>0.00</td>
</tr>
<tr>
<td>Dividends</td>
<td>-25.5%</td>
<td>-30.5%</td>
</tr>
</tbody>
</table>

* Statistically significant results in yellow.
Distress and Risk-Taking - Tests

• The results thus far document that distressed banks deleverage:
  -- This is consistent with capital preservation and reducing risk.
• However, they do not rule out that banks could deleverage but still gamble with a smaller portfolio (e.g., shed safe assets).
• We consider the evolution of riskiness for distressed bank using the following regression framework:
  \[ \Delta \text{Risk Measure} (q, q+4) = f(D, D*Crisis, X4, Quarter FE, State FE) \]
• We measure risk using 4 measures:
  (1) Log Z-Score: Distance from default, (2) Non-performing loans, (3) Earnings volatility, and (4) Risk-weighted assets (RWA) / Assets
• If distressed banks increase risk-taking, we expect risk to increases in these risk measures.
  -- A caveat is that we can only measure the risk we can observe.
Distress and Risk-Taking - Results

- Regression Results: Distressed banks do *not* have increases in risk, conditional on controls.
- In both periods, we find distressed banks have:
  - Higher Z-scores
  - Improved (or at least no worse) performing loan ratios
  - Reduced earnings volatilities
  - Reduced RWA/Assets (latter period only)
- Some earlier evidence suggests loans to managers/shareholders is a potential way in which banks may increase their risk.
  - We find loans to executives do not increase for distressed banks.
- The impact of crisis period and TARP is ambiguous and depends on period and risk measure.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Z-Score</td>
<td>84.4%</td>
<td>84.2%</td>
</tr>
<tr>
<td>Performing Loan Ratio</td>
<td>0.54</td>
<td>0.23</td>
</tr>
<tr>
<td>Earnings Volatility</td>
<td>-0.32</td>
<td>-0.24</td>
</tr>
<tr>
<td>RWA/Assets</td>
<td></td>
<td>-7.46</td>
</tr>
<tr>
<td>Loans to Executives</td>
<td>-19.9%</td>
<td>-36.3%</td>
</tr>
<tr>
<td>Loans to Executives/Total Loan</td>
<td>-0.045</td>
<td>-0.069</td>
</tr>
<tr>
<td>Loans to Executives (Yes)</td>
<td>-7.6%</td>
<td>-13.1%</td>
</tr>
</tbody>
</table>

* Statistically significant results in yellow.
Conclusion

• We find that distressed banks:
  -- Deleverage on average and do so on all parts of balance sheet
  -- Have lower observed risk over 1, 4, and 8 quarter horizons.

• The main result is robust:
  -- Holds for the years surrounding both the S&L crisis and the GFC
  -- Different types of banks (public/non-public), small/large.

• Overall our results suggest deleveraging is a behavior for distressed banks on average
  – inconsistent with moral hazard stories suggesting otherwise.

• Policy implications for the next wave of bank failure/distress:
  -- Need to stay aware of the potential for moral hazard in banking due to government programs; for example some programs have come with federal guarantees under certain conditions, i.e. PPP program
  -- Our results suggest, the typical distressed bank focuses on capital preservation and deleveraging.
  -- However, because bad apples will exist, regulatory actions such as those that require deleveraging for risky banks (cutting dividends, raising capital, etc.) continue to be important to mitigate moral hazard.
Appendix: Robustness Tests

- Overall, we find that distressed banks shrink their assets and liabilities, increase equity, and do not increase observable measures of risk over a 4-quarter horizon as measured by our various risk measures. However, the weakest distressed banks, are likely to be unable to increase capital and fail, and thus only the surviving banks remain thus they naturally increase their capital.

- To alleviate the possibility of such survivorship bias driving our results, we also look at a 1-quarter horizon. We find similar results in these tests.

- We also conduct the following tests:
  - Re-estimate the regressions with the risk variable being beyond a 4-quarter window, i.e. 8 quarters or 12 quarters.
  - Consider the individual risk measures (10th percentile equity/assets and zscore).

- In these additional tests as well, we still observe the results being consistent with distressed banks reducing assets/liabilities, and de-risking, or at least not increasing risk-levels.
Appendix: Other Tests - Extensions

- Literature suggests that moral hazard incentives could be stronger for public banks but such banks also are thought to enjoy implicit (TBTF) subsidies which could increase these incentives.
  - Thus, it is an empirical question and to test it, we break the sample into public and private banks.
  - The results are similar despite considerable differences in the size, incentives, and regulation over the two subsamples.
- The FDIC Improvement Act (FDICIA), adopted in 1991, introduced prompt corrective action (PCA).
  - In additional tests, we exclude banks most constrained by regulatory capital constraints (i.e., those that have breached at least one PCA threshold).
  - We find qualitatively similar results suggesting factors beyond regulation matter for deleveraging incentives.
- As additional robustness checks, we also test whether banks that eventually fail behave differently from banks we define as distressed.
  - We find that banks that fail take actions similar to those that do not fail (reduce assets, reduce liabilities, and reduce employees etc.); however, not surprisingly these banks are unable to boost equity.